

Transoral, minimally invasive, video-assisted technique for lingual thyroid

Elsharawy Kamal and Ahmed M. Abd El-Fattah

Department of Otolaryngology, Faculty of Medicine, Mansoura University, Mansoura, Egypt

Correspondence to Ahmed M. Abd El-Fattah, Department of Otolaryngology, Faculty of Medicine, Mansoura University, Mansoura, Egypt
Tel: +20 1001908407; fax: +20 50 2267016; e-mail: ahmusaad@mans.edu.eg

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Introduction

Lingual thyroid is a rare developmental congenital anomaly. Symptoms may not develop unless the gland enlarges because of gland hypertrophy or malignancy. When removal is advocated, most proposed techniques are invasive and associated with substantial morbidity.

Materials and methods

The approval of the Otolaryngology Department Research and Ethics Committee, Mansoura University, to perform an analysis of a new minimally invasive surgical technique for the management of a case of obstructive lingual thyroid gland was obtained before study commencement. Careful preoperative assessment of the diagnosis of the lingual thyroid gland included an ^{131}I scan and an MRI of the head and neck with and without gadolinium.

Results

A transoral, minimally invasive, video-assisted thyroidectomy, using Harmonic shears, was performed on a 22-year-old man with a longstanding lingual thyroid that had begun to cause dysphagia and upper airway obstruction. The procedural time was 85 min, and the estimated blood loss was 20 cm³. The patient tolerated a regular diet with minimal discomfort and was discharged home within 24 h.

Conclusion

The combination of the transoral endoscope-guided technique with Harmonic vascular control is considered a surgically minimally invasive satisfactory option in well-trained hands familiar with such tools.

Keywords:

endoscope, Harmonic shears, lingual thyroid, tongue base, video-assisted

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Introduction

Lingual thyroid is a developmental congenital anomaly, with a reported incidence ranging from 1:10 to 1:100 000 [1]. Microscopic lingual thyroid tissue is relatively common but rarely becomes clinically problematic [2]. Symptoms may not develop unless the gland enlarges because of gland hypertrophy or malignancy. Although many patients remain asymptomatic, symptoms may include foreign body sensation in throat, dysphagia, dysphonia, hemoptysis, and respiratory difficulties. The diagnosis is generally suspected when physical examination reveals a midline tongue mass with the appearance of thyroid tissue and little or no palpable thyroid tissue in the anterior neck, and it can be confirmed with a variety of imaging techniques, including an ^{123}I or ^{131}I scan, ultrasonography of the neck (confirming the absence of a cervical thyroid), MRI, or an iodine-contrasted computed tomography scan that concentrates on the tongue base [3].

Treatment modalities mainly include surgical excision or hormonal suppression [1,4,5]. Ablation therapy has been discouraged because of reported concerns of delayed clinical response and potential exacerbation of airway obstruction. Reservations were also expressed about the

radioactive dose needed to ablate lingual thyroid tissue, stating that most ectopic thyroid tissue is hypoactive and that the ablative dose would be too toxic [1,6]. When removal is advocated, most proposed techniques are invasive and associated with substantial morbidity, including splitting of the lip [7], splitting of the tongue [8], splitting of the mandible [9], and transcervical pharyngotomy [10].

Minimally invasive surgical techniques have been proposed for many disorders of the head and neck. Accordingly, we tried to use a minimally invasive video-assisted thyroidectomy (MIVAT) in a case of obstructing lingual thyroid by applying a transoral access. Our main goal with this technique was to achieve optimum safety and an adequate approach to one of the most challenging surgical areas (tongue base).

Materials and methods

The approval of the Otolaryngology Department Research and Ethics Committee was obtained before study commencement to perform an analysis of a new surgical

technique for the management of a case of obstructive lingual thyroid gland.

Comprehensive patient demographic data were obtained on a patient with a lingual thyroid gland, including age, sex, thyroid function studies, comorbidities, postoperative complications, and any required interventions or additional surgery. Careful preoperative assessment of the diagnosis of lingual thyroid gland included an ^{131}I scan and MRI of the head and neck with and without gadolinium. In addition, preoperative laryngoscopic examination of the lingual thyroid was performed.

Supplemental thyroxine was prescribed in an attempt to suppress endogenous thyroid stimulating hormone production and thereby to shrink the mass. Despite a month of suppressive therapy, no change in the size of the tongue mass was noted. Moreover, upper airway obstruction and dysphagia worsened and surgical excision was required.

Results and description of the technique

The safety and efficacy of the proposed technique were validated by performing the procedure on a 22-year-old man with a 5-year history of a mass at the tongue base presented after 8 months of increasing size and symptoms of dysphagia and change of voice.

On examination, the patient's voice was slowed, slurred, and without audible stridor. His tongue base appeared slightly enlarged and a firm midline mass could be palpated in the posterior tongue base. No thyroid tissue was palpated in his anterior neck. On flexible laryngoscopy, a large, grayish-white, vascular mass was noted on the tongue base, nearly obstructing the posterior oropharynx (Fig. 1). Beyond the mass, the larynx was normal.

A thyroid uptake scan demonstrated iodine uptake in the lingual mass, with no evidence of thyroid tissue elsewhere. The patient was diagnosed with a lingual thyroid and referred to the Head and Neck Team of the Otolaryngology Department of Mansoura University Hospitals for further evaluation and treatment recommendations. An MRI of the head and neck showed a $4.3 \times 3.9 \times 4$ cm heterogeneously enhanced mass arising from the tongue base (Fig. 2). The patient's thyroid hormone levels were within normal range. After an informed consent was obtained, endoscopic surgical excision (MIVAT) was performed by a surgical team that consisted of the two authors. The surgical time was 85 min and the estimated blood loss was 20 cm^3 [3].

The patient was brought to the operating room and placed supine on the operating table. After satisfactory induction of anesthesia, the patient was nasotracheally intubated and a side mouth retractor was placed to open the mouth. After sterile prepping and draping of the patient, intraoral access was established and adequately maintained.

Figure 1



Preoperative laryngoscopic examination showing an obstructive lingual thyroid gland.

Figure 2



Sagittal MRI images of the head and neck showing a $4.3 \times 3.9 \times 4$ cm mass arising from the tongue base and nearly completely obstructing the airway. The mass shows heterogeneous enhancement following gadolinium administration.

Three retraction sutures of 2-O silk were placed in the oral tongue, one in the midportion and two laterally, and excellent exposure of the lingual thyroid gland was therefore established. Under endoscopic guidance with a 4-mm, 70° endoscope, Harmonic shears (ACE-23p; Ethicon Endo-Surgery, Cincinnati, Ohio, USA) were used to incise the mucous membrane adjacent to the attachment of the

lingual thyroid. A cleavage plane between the thyroid and tongue musculature could be appreciated and was divided in a sequential manner using the Harmonic shears (Fig. 3).

Once the plane was developed anteriorly and on either side of the lingual thyroid, a clamp was used to grasp an edge of the thyroid gland to afford retraction. At the same time, a posteriorly based tongue base flap was elevated and maintained away from the ectopic thyroid throughout the entire process (Fig. 4). The use of the 70° endoscope allowed easy resection of the posterior part of the ectopic thyroid with preservation of the flap. Steam generated by the ligation of tissue using the Harmonic shear was simultaneously evacuated.

On completion of the resection, no areas of bleeding were detected and hemostasis was adequate. The resection bed was reconstructed with the previously created tongue base flap by suturing it anteriorly to the intact oral tongue mucosa using 3-0 vicryl sutures (Fig. 5).

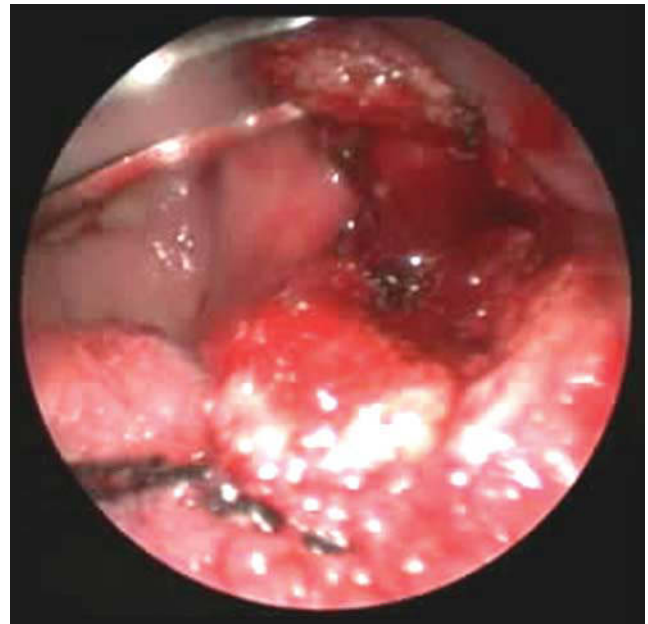
The patient was extubated immediately and kept under observation in the recovery room in accordance with a routine protocol. The patient tolerated a regular diet with minimal discomfort and was discharged home within 24 h. After 1 week, postoperative laryngoscopic examination of the surgical bed showed extraordinary healing and the patient suffered no symptoms at all by this time.

Discussion

When lingual thyroid is suspected, work up should include a thorough head and neck exam, thyroid function

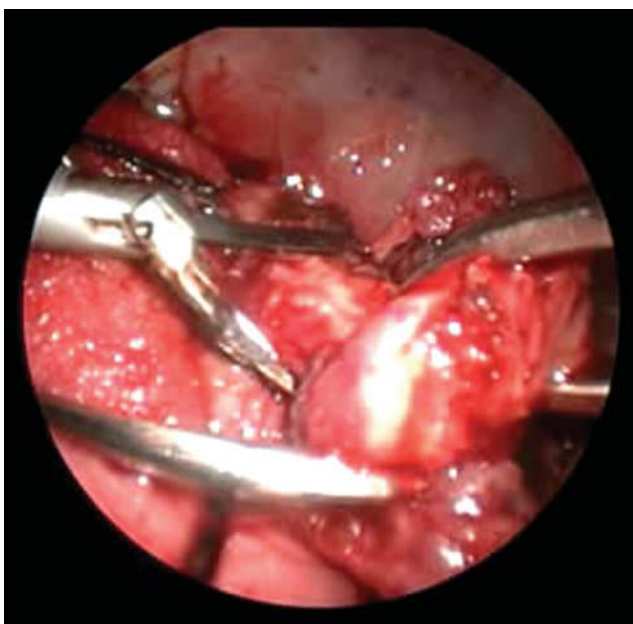
tests, photodocumentation, and some form of imaging. Imaging modalities include ultrasound, computed tomography scan, MRI, and radionuclide thyroid scan. This work up helps to confirm the diagnosis, excludes other ectopic thyroid tissue, and inform us of whether the lingual thyroid is the only functioning thyroid tissue. Biopsy carries a risk for hemorrhage and acute thyrotoxicosis, and when the above tests are performed, biopsy

Figure 4



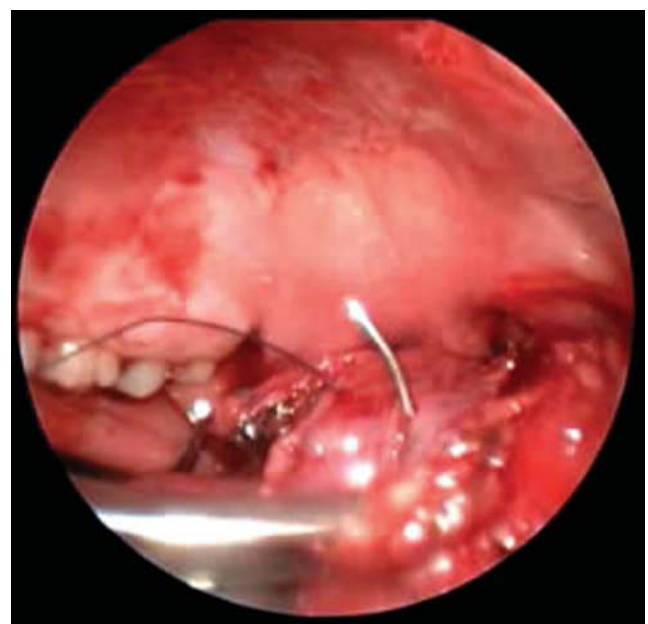
A posteriorly based tongue base flap was created.

Figure 3



Video-assisted endoscopic resection (minimally invasive, video-assisted thyroidectomy) of the lingual thyroid gland using Harmonic shears.

Figure 5



Reconstruction of resected surgical bed by suturing the flap to the oral tongue.

may be unnecessary because of the low risk of malignant transformation [11].

Traditional medical treatment options for symptomatic lingual thyroid may include hormone suppression with supplemental thyroxine or radioactive iodine ablation. Surgical intervention is indicated in patients who fail or worsen on medical therapy or who have significant symptoms, such as dysphagia, airway compromise, or hemorrhage. Techniques for the removal of a lingual thyroid that have been published are often quite invasive and are associated with substantial patient morbidity and prolonged hospitalization. These major surgeries carry a risk of edema, hemorrhage, permanent hypothyroidism, and injury to vital structures, in addition to disfigurement and scarring. Any postsurgical residual thyroid tissue may hypertrophy and cause recurrent symptoms [7–10].

We describe a new modality for treatment of symptomatic lingual thyroid by applying an MIVAT technique, using the transoral ultrasonic resection procedure. Terris *et al.* [12] published the first case report on endoscope-assisted resection of the lingual thyroid gland using Harmonic shears in a 34-year-old woman with lingual thyroid, after failure of suppressive thyroxine therapy. The patient did well postoperatively and remained symptom free for more than 3 years after surgery. Ours is the second reported case of using endoscopic guidance and Harmonic vascular control (MIVAT) to treat symptomatic lingual thyroid. As in the previous case, our patient had an uncomplicated postoperative course and has had no recurrent symptoms.

When the proposed technique for resection of the lingual thyroid gland is performed correctly, there is minimal intraoperative blood loss and little to no damage to surrounding tissues, which results in improved wound healing and reduced postoperative pain. Risks include bleeding; pain and infection can be minimized by using a posteriorly based tongue base flap for reconstruction of the resected bed. The impact on our patient was minimal and was therefore associated with excellent patient satisfaction.

Dasari *et al.* [13] and Cunningham *et al.* [14] have published two case reports on radiofrequency ablation of a lingual thyroid with an uncomplicated postoperative course and no recurrent symptoms. They concluded that radiofrequency ablation of lingual thyroid is a minimally invasive simple and effective technique with minimal morbidity that can be repeated if necessary. Although this procedure could be considered as another minimally invasive technique for lingual thyroid, our proposed

transoral MIVAT could be applied to other challenging tongue base lesions that need adequate excision with minimal morbidity.

Conclusion

Lingual thyroid is a rare congenital anomaly that may present with symptoms severe enough to justify surgical intervention. The combination of the transoral endoscope-guided technique with Harmonic vascular control is considered a surgically minimally invasive satisfactory option in well-trained hands familiar with such tools. However, further studies are warranted to determine the safety and long-term efficacy of this procedure in other tongue base disorders.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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